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Mapping Tree Cover and Conservation Practices for the Resilience in the Sahel Enhanced (RISE) Programs: On-farm tree cover mapping

In order to support the U.S. Agency for International Development (USAID) RISE Program and to help USAID geographically target investments, the U.S. Geological Survey Earth Resources Observation and Science Center is mapping and monitoring land use, tree cover, and soil, water, and vegetation conservation practices across two RISE Focus Zones in Burkina Faso and Niger. In July, the first maps of land use/land cover, agriculture conservation practices, and on-farm tree cover density were completed and presented to the USAID Sahel Regional Office in Dakar.

This infosheet reports the results of on-farm tree cover mapping in the RISE Focus Zones. On-farm tree cover, or agroforestry, is defined as "a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence" (Lundgren and Raintree 1982). It includes measures that increase the density of trees on pastures and croplands, through tree planting, and farmer managed natural regeneration (FMNR).

We mapped the density of on-farm tree cover in the focus zones using 6 classes: no tree cover (0%), open with isolated trees (0-2%), low tree cover (2-5%), medium tree cover (5-15%), high tree cover (15-25%), and very high tree cover (>25%). In both focus zones, 46 percent of the farmland is covered by trees, of which 27 percent is open with isolated trees, 15 percent is covered by a low level of tree cover, and 4 percent by a medium level of tree cover (Figure 1). The maps show that, on average, the communes in Burkina Faso (western focus zone) and southeastern Niger (eastern focus zone) have relatively high tree cover density on farmland (averaging respectively 3.2 and 2.1 percent) (Figure 1). The communes of Gayeri and Bilanga in Burkina Faso have the highest average on-farm tree cover (5-6 percent).

The results of on-farm tree cover mapping by commune are necessarily related to the percentage of farmland in each commune. To visualize this relationship, we classified the communes in four categories:

- **High average on-farm tree cover on extensive farmland** (*i.e.* percent of farmland >= 50% and average on-farm tree cover >= 2%)
- **High average on-farm tree cover on limited farmland** (*i.e.* percent of farmland < 50% and average on-farm tree cover >= 2%)
- **Low average on-farm tree cover on extensive farmland** (*i.e.* percent of farmland >= 50% and average on-farm tree cover < 2%)
- **Low average on-farm tree cover on limited farmland** (*i.e.* percent of farmland < 50% and average on-farm tree cover < 2%)

The most interesting pattern is located in Niger in the southern part of the regions of Zinder and Maradi (Figure 2). In these communes between 50 and 100 percent of the farmland is covered by trees at various densities (high average on-farm tree cover on extensive farmland). These areas show the current extent of FMNR in the RISE Focus Zones. Finally, if the land is suitable for this practice, the communes classified as "low average tree cover on extensive farmland" or "low average tree cover on limited farmland" could have a potential for scaling-up FMNR.

Lundgren, B.O. and Raintree, J.B. 1982. *Sustained agroforestry*. In: Nestel B. (ed.). Agricultural Research for Development:Potentials and Challenges in Asia, ISNAR, The Hague, The Netherlands. pp. 37-49. Available on-line at http://pdf.usaid.gov/pdf_docs/PNABC621.pdf

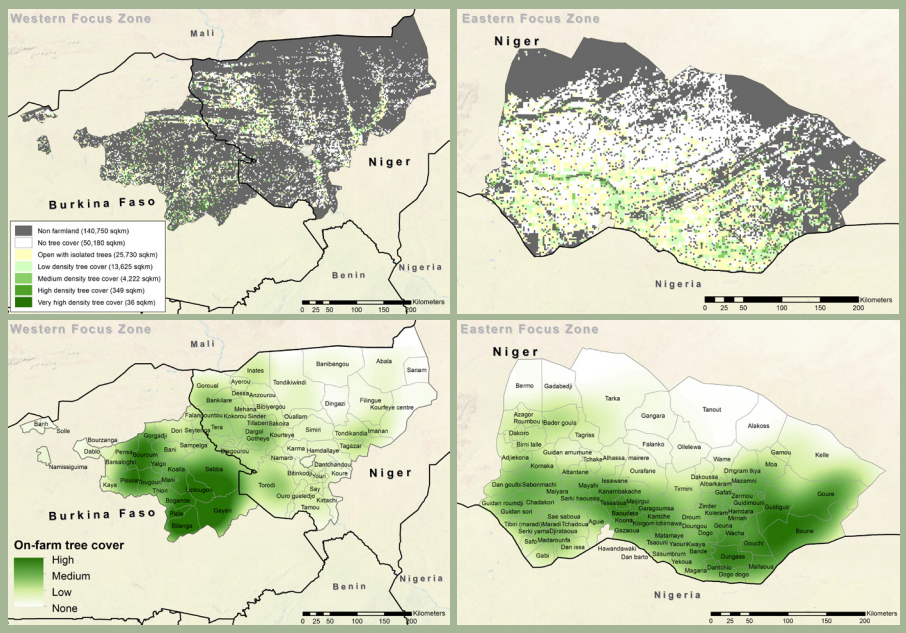

Figure 1. On-farm tree cover (top) and on-farm tree density map (bottom) in the RISE Focus Zones.

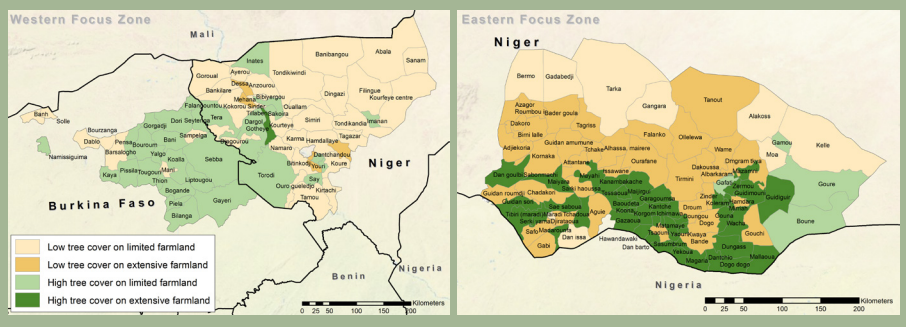

Figure 2. Average on-farm tree cover associated with percentage of farmland in the communes of the RISE Focus Zones.